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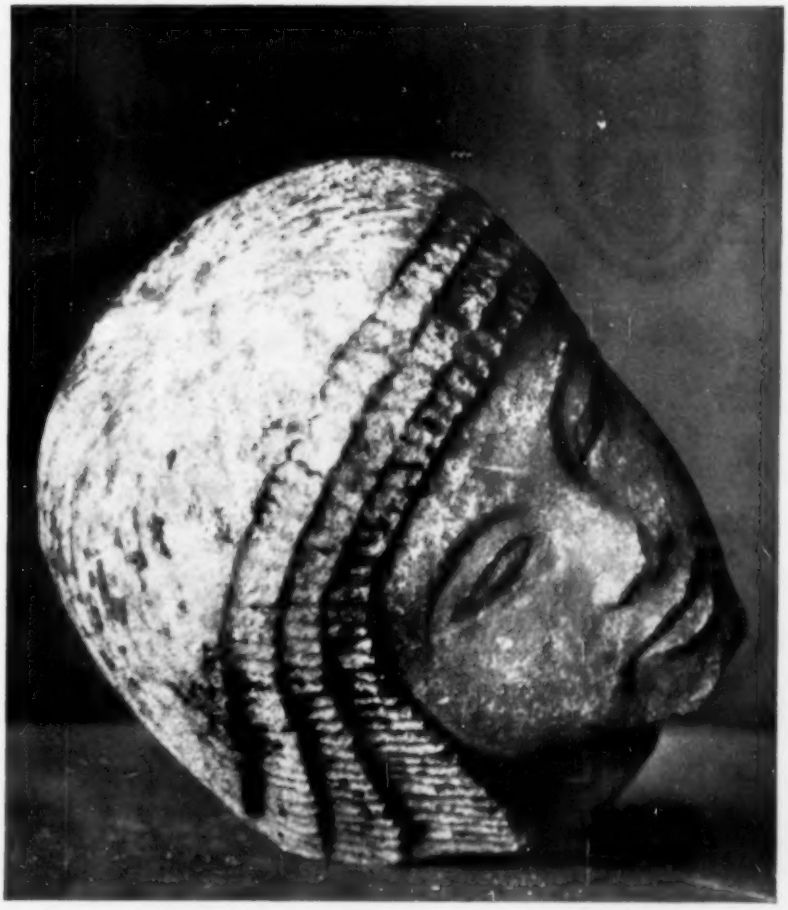
SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •



MARCH 12, 1932

Portrait of a Queen

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SCIENCE NEWS LETTER

VOL. XXI *No. 570*

The Weekly Summary of Current Science

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Edited by WATSON DAVIS

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? DO YOU KNOW THAT ?

Portable equipment for quick freezing of fruits and certain vegetables can now follow maturing crops in years of big harvest, and can save for future use quantities of food that would ordinarily be wasted.

A Dolly Varden trout in a California fish hatchery lived to be 19 years old.

Inflammable gas is present in many hardwood trees, sometimes escaping with a loud report when a hole is bored into the tree.

The boundary line between New Mexico and Colorado, long a subject of dispute, will be settled this year, when a government survey is completed.

Children have keener taste-sense than adults.

The Spaniards who explored America gave the pineapple its name, because they thought the fruit looked like a pine cone.

Copper that is harder than most common steels has been produced.

The spread of the American gray squirrel in Great Britain in recent years has been noted by British foresters with consternation.

A new process for finishing tires involves welding color into the tire walls and makes it possible to have tires conform to the color scheme of the car.

A house built in Cleveland has roof, outer walls, and some inner walls made of porcelain-enameled steel.

In the ruins of the market place of Athens has been found an ancient reservoir which may have formerly supplied the Greek Senate.

At the palace of ancient kings of Kish, in Babylonia, archaeologists have discovered an outdoor swimming pool equipped with pipes for supplying fresh water continuously and other pipes for removing the overflow.

WITH THE SCIENCES THIS WEEK

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Science Service presents over the radio, an address

THE GULF STREAM

By H. A. Marmer, of the U. S. Coast and Geodetic Survey, and leading authority on tides and currents

Friday, March 18, at 3:45 P. M., Eastern Standard Time

Over Stations of

The Columbia Broadcasting System

PHYSICS

Tapping of the Atom's Energy Achieved in New Experiment

Cosmic Rays Produced Artificially for First Time as Beryllium Core Engulfs Helium Without Disintegrating

COSMIC RAYS, most piercing radiation known to man, have been produced artificially for the first time at the Physical Institute of the University of Giessen by Prof. W. Bothe and Dr. H. Becker. The process gains energy at the expense of the matter in the atom nucleus and thus realizes the old hope of tapping the energy of the atom.

Beryllium metal, bombarded with alpha particles from the radioactive element polonium, was in these experiments made to emit rays as penetrating as 14 million-volt X-rays so far unattained by man. The new rays are so penetrating that after passing through nearly three inches of iron they have lost only a third of their intensity.

Artificial Transmutation

Previous experiments on the bombarding of atoms with alpha particles, which are helium atom nuclei moving at high speed, have resulted in the production of proton rays, the speeding hearts of hydrogen atoms. Artificial transmutation of the target atom nucleus into another chemically different element, had thus been attained by the loss of the hydrogen nucleus.

Drs. Bothe and Becker found, however, that beryllium gave off no protons when bombarded by alpha particles. The alpha particle entered the nucleus of the beryllium atom which at the same time emitted cosmic rays holding much more energy than the impinging alpha-particle projectiles.

Hitherto unknown carbon atoms of atomic weight 13 were thus formed from each of the beryllium atoms hit. This achievement constitutes a new type of transmutation of a chemical element. The process can be represented by an equation similar to those used to picture chemical reactions.

Six of the light chemical elements, Drs. Bothe and Becker found, gave the artificial cosmic or hard gamma rays under the action of the polonium alpha particles. These elements were: lithium, beryllium, boron, fluorine, magnesium and aluminum. Of these, beryllium gave by far the most intense secondary rays and therefore was most suitable for experiments. Some of these elements also emitted proton rays.

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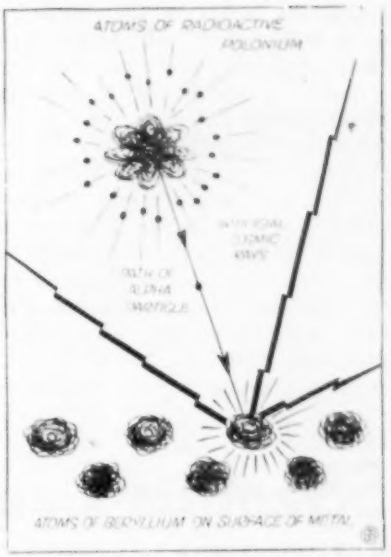

POWERFUL BOMBARDMENT

This diagram shows how radioactive polonium sends out showers of speeding alpha particles, of which only one in a great number scores a hit on a beryllium atom and thus sets up a cosmic radiation.

ARCHAEOLOGY

Unearth New Portrait Of King Tut's Girl-Wife

See Front Cover

A NEW portrait of the girl-wife of that well-known Egyptian pharaoh, Tutankhamon, has been unearthed from the ruins of Tel-el-Amarna, where the Egypt Exploration Society has been excavating. The portrait is a beautiful little head, with exquisitely modeled features. It is less than two inches long.

Identity of the portrait has been settled with reasonable certainty by J. D. S. Pendlebury, who directed the excavations. Without hesitation, Mr. Pendlebury pronounced the face to be so closely like that of a woman on the back of a chair in Tutankhamon's tomb, that both must be the same character. The portrait on the chair is that of Tutankhamon's wife.

The little sculptured head bears a startling likeness to the famous beauty Queen Nefertiti, it was also pointed out. This is added proof of the identity of the portrait, for Nefertiti was the mother of the princess who became Tutankhamon's queen.

Science News Letter, March 12, 1932

PHYSICS

German Physicist Interprets Experiments With Cosmic Rays

By Prof. Dr. W. Bothe, of the Physical Institute of the University of Giessen

OUR EXPERIMENTS show that energy is gained if any alpha particle is shot into the beryllium nucleus. That is to say, by addition of an alpha particle to the beryllium nucleus, a carbon nucleus of atomic weight 13 is produced which contains less energy than the two original nuclei together.

These experiments give a hint as to the way in which the building up of the atom nuclei actually takes place in the universe: The heavier nuclei are produced by steps from the lighter. The hypothesis which Dr. Robert A. Millikan has made to explain the "ultra-rays" (cosmic rays), that the heavy nuclei are formed direct by the sudden combination of a great number of protons and electrons is accordingly very improbable.

In still another connection the gamma radiation from beryllium is of interest in connection with the problem of the cosmic rays. The new rays are much harder than the known radioactive gamma rays, their penetrating power approaches close to that of the softest components of the cosmic rays. Thus in the beryllium rays one can study the properties of a gamma radiation which has approximately the

penetrating power of the cosmic rays. As is well known, my earlier experiments with Prof. Werner Kolhorster (reported by Science Service in January, 1930) showed that the properties of the cosmic rays are very different from those of a gamma radiation, and that the cosmic rays behave rather as a corpuscular radiation. Dr. H. Becker and I have now carried out the same experiments with the gamma rays from beryllium; it turns out that these still behave completely like a normal gamma radiation and quite differently from the cosmic rays. This is further strong support for the idea that the cosmic rays have a particle-like nature in the lower layers of the atmosphere.

A series of other light elements, as well as beryllium, can be artificially excited to gamma ray emission. The production of artificial gamma rays is just as general a phenomenon as the breaking up of atomic nuclei. In this radiation we have a means of studying the structure of the lighter atomic nuclei; we are standing at the threshold of a "nuclear spectroscopy." Indeed the light atom nuclei are of special interest.

Science News Letter, March 12, 1932

BIOCHEMISTRY

Scientists Learning Secret of How Plants Manufacture Food

THE CHEMICAL process which scientists consider most essential to life on earth and which so far has eluded the most penetrating and painstaking research is now yielding its secrets to Prof. James B. Conant of Harvard.

Prof. Conant is helping find how plants use sunlight to change the inert gas, carbon dioxide, plus water, into sugars and starches on which they live and grow. The key to his work is a new formula which he suggests for chlorophyll, the complex green substance that is instrumental in converting raw materials into plant food.

He described the formula when he was recently presented the Nichols medal of the New York section of the American Chemical Society in recognition of this work. Scientists have known for some time that each molecule of chlorophyll *a*, one of the two chlorophyll compounds, contains 55 carbon, 72 hydrogen, five oxygen and four nitrogen atoms, and one magnesium atom. Prof. Conant has worked out a formula like a crazy-quilt pattern which shows how these atoms are joined together.

Advances Summarized

Notable advances in the same field of work for which Prof. Conant was given the Nichols medal have been made by German scientists.

"The green coloring material of plants was shown by the German scientist Willstaetter in 1912 to be a mixture of two compounds, chlorophyll *a* and chlorophyll *b*," Prof. Conant said. "These substances absorb sunlight, which thus furnishes energy for the production of sugar and starches from carbon dioxide. Willstaetter showed that the chlorophyll molecule contains magnesium and can be converted by drastic treatment into a series of red compounds known as porphyrins. A similar, but not identical, porphyrin is responsible for the red color of blood. It is protoporphyrin which combined with iron and a protein is hemoglobin, the actual red blood coloring material.

"In the last five years Hans Fischer of the University of Munich has discovered how to synthesize porphyrins and has thus established the structure of the blood porphyrin and the chlorophyll porphyrins. This knowledge is fundamental to an understanding of chlorophyll.

"These porphyrins are compounds with a large ring made up of four smaller pyrrole rings each containing a nitrogen atom. The relation between the green chlorophyll *a* compounds and the red porphyrins, and the nature of certain additional groupings of atoms characteristic of the chlorophyll molecule have been the subject of study at Harvard in the last four years."

Prof. Conant pointed out that the American research has shown that the green series of compounds derived from chlorophyll *a* has as its basis the nucleus of the porphyrin plus two hydrogen atoms. A similar relationship is well known between benzene, or benzol, and the terpenes, such as occur in essential oils. Thus chlorophyll *a* has as its base a reduced porphyrin ring.

PROF. JAMES B. CONANT
—who is attacking one of science's most difficult problems.

Chlorophyll *b* is like chlorophyll *a* except for the fact that one oxygen atom replaces two hydrogen atoms on the ring.

Prof. Conant declared that the final formulae for chlorophyll *a* and *b* must be considered as provisional. But he believes the essential nature of all the atomic groupings in the molecule is understood.

Science News Letter, March 12, 1932

ENTOMOLOGY

Cannibal Grasshoppers Infect Selves with Fungus

GRASSHOPPER species that practise cannibalism on the bodies of their defunct brethren may be unwittingly arranging for their own demise from the same disease. This is indicated by results of an investigation announced in *Science*, by Maurice T. James of the University of Colorado.

Mr. James laid out a number of freshly-killed grasshoppers of a common western species, and found that the bodies were attacked by members of the same species, which bit into the bodies from underneath and ate out the soft contents of the thorax or chest region. He also found that in at least a few cases the grasshoppers also ate the bodies of their comrades that had died of a fungus disease. This suggests a "sure-fire" method by which this disease may be spread in nature.

Science News Letter, March 12, 1932

MICROSCOPY

New Microscope Sees Cells Whirled at Bullet-Like Speed

Light Flashing on Specimen Borne by Turbine-Like Rotor At High Speed Permits Continuous Picture to Be Obtained

IT IS NOW POSSIBLE to watch the details of the behavior of cells and other objects whirled at bullet-like speeds subjecting them to a centrifugal force equivalent to about 200,000 times gravity. This can be done by means of a new combination of two recently evolved instruments, the centrifuge microscope and the super-centrifuge.

The centrifuge microscope was devised by Prof. E. Newton Harvey of Princeton University and A. L. Loomis of Tuxedo Park, N. Y. It whirls the object to be examined around on the end of a rotating arm, flashing a light on it for a brief instant at one point in each revolution, so that the series of instantaneous glimpses thus obtained can be seen, cinema-fashion, as a continuous picture. Its speed, however, is comparatively limited: with the most improved model Prof. Harvey has been able to obtain only about 10,000 revolutions per minute, giving a centrifugal force of about 12,000 times gravity.

The super-centrifuge is the invention of Dr. J. W. Beams and A. J. Weed of the University of Virginia. It is a top-shaped case of steel, with diagonally placed vanes underneath. It rests in a funnel-shaped cup, with an air inlet at the bottom. When air under pressure is admitted, it lifts the top and at the same time spins it by pressing against the vanes, turbine-fashion. In this way terrific speeds can be obtained with virtually no friction, for the rotor rides on a cushion of air. Rim velocities one-third as high as the muzzle velocity of a rifle bullet have been obtained, with centrifugal force up to half a million times gravity.

Now Prof. Harvey has adapted the principle of the centrifuge microscope to the super-centrifuge. Dr. Beams and Mr. Weed have built for him a rotor with two inclined stellite mirrors, one near the rim, directly under the place where the slide carrying the cells is placed, the other at the center, to reflect the image a second time, upward into a microscope. The new device is described in *Science*.

Each time the glass slide carrying the cells passes under a special narrow-filament light at one side, it receives a brief moment of illumination, and this is flashed through the cells, from one mirror to the other, and up into the microscope. The speed at which the device can be operated is limited by the strength of the glass slide, which will break if it is whirled too fast. Prof. Harvey estimates a force of 200,000 gravities as the limit at which the new super-centrifuge microscope can be used at present.

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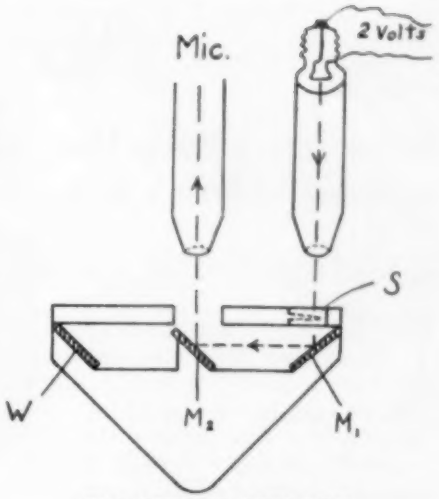


FOR BETTER BIOLOGY

In the new centrifuge microscope, two mirrors (M1 and M2) are mounted on the Beams' rotor in such a position that the image of the object on a special slide (S) is reflected into a microscope (Mic) mounted above and on the axis of the rotor. W is a counterweight for balancing the rotor. The illumination is a narrow image of the filament of a straight-filament tungsten lamp.

ORNITHOLOGY

Scientist Seeks Museum Specimens of Extinct Birds

WHERE are the mounted museum specimens of extinct or near-extinct species of birds?

Who has a passenger pigeon, a great auk, a heath hen? Burlingham Schurr, curator of the museum of zoology at Amherst College, wants to know.

He is broadcasting an appeal to all naturalists and museum curators to report briefly on the specimens they have of these birds or their eggs, as well as the Eskimo curlew, California vulture, Carolina paroquet, ivory-billed woodpecker and any other birds noteworthy for rarity, giving place and date of collection when these are known. It is Mr. Schurr's intention to publish a list, making the whereabouts of these rare specimens known for the benefit of all ornithologists.

Science News Letter, March 12, 1932

PHYSIOLOGY

Overdose of Caffein May Cause Sterility in Males

TOO MUCH caffein, the stuff that puts the "kick" in coffee, may have a bad effect on the male reproductive physiology, even causing partial or total sterility. Such at least is the indication of experiments by Prof. Hermann Stieve of the University of Halle, reported in *Die Umschau*.

Prof. Stieve administered to male guinea pigs doses of caffein ranging from .018 to .09 grams per kilogram of body weight. They became partially or totally sterile, and anatomical examination showed degenerative changes in their reproductive glands.

However, undue alarm need not be taken by human beings, for a little calculation shows that to take in .09 gram of caffein per kilogram of body weight an average-sized man would have to swallow four or five gallons of the strongest coffee. Race suicide by the coffee route is therefore considered hardly a practical menace. But the danger that lurks in becoming habituated to caffein tablets, which some persons take freely in order to keep going under strain, is not to be minimized.

Science News Letter, March 12, 1932

PSYCHOLOGY

Why Stutterers Stutter

Novel Theory Holds That This Abnormality in Speech Is Result of Brain's Halves Being Too Nearly Balanced

By MARJORIE VAN DE WATER

PERHAPS you stutter. If you do, you may find some small consolation for your handicap in the realization that you have plenty of company. It is estimated that the number of stutterers in the United States is more than ten times the number of blind and deaf-mute put together. More than a million in this country are stutterers! Approximately a fourth of these are children.

Many are the "cures" that have been proposed from the time that Demosthenes put a pebble under his tongue to cure a speech defect until today, when the stutterer is urged to develop his will, to make himself believe that he will not stutter, to force himself to adopt a deliberate slow speech, or to drill interminably over lists of the most troublesome words or sounds.

Some of these methods have helped. Under certain conditions, the stutterer might be enabled to talk in such a fluent fashion that his associates might not know that he was a stutterer. But for the most part the stutterer still remained a stutterer. By earnest and continuous struggle he might succeed in speaking clearly, but it would always be under a strain that the non-stutterer has never experienced.

A Matter of Guessing

That is because so little was known about why stutterers stutter. Those who formulated the cures did not know the cause of what they were trying to remedy. They made guesses, of course. Everyone who has been a stutterer, or known a stutterer, has made guesses. But in the absence of scientific evidence one man's guess was just as good as another's, or, as the Irishman is credited with saying, it was better.

Today many scientists are devoting careful research to the problem of speech defects, and much knowledge is being gained from their endeavors. Not long ago, 28 leading experts in this field contributed to a symposium, giving their views and pointing the way for further research. One of these experts was Dr. Lee Edward Travis, director of the Speech Clinic in the University of Iowa—a unique clinic for treating speech disorders with the aid of all available scientific devices and the best knowledge of the day.

Dr. Travis has, as a result of experiment and research begun when he was a fellow of the National Research Council in 1924, developed a theory of his own explaining the origin and cause of stuttering and has described it in a new book, "Speech Pathology."

It is a novel theory. But it is one which has the support of recent research in the biological sciences. And it is practical. It has led to the development of treatment which has relieved many of the most severe cases of speech disorder.

One of the most important of Dr. Travis' discoveries is that stuttering is not merely a matter of a "twisted tongue" or malfunction of the organs of speech. When a man stutters, he stutters all over. His breathing becomes extremely irregular. The breathing movements of the abdomen and of the chest are out of harmony. He is unable to continue a rhythmic movement such as the opening and closing of his hands. The time between a blow on the tendon of the knee and the familiar "knee jerk" is greatly reduced and the action continues for a longer time than it does in the same person when not stuttering, indicating a lack of activity in the brain cortex during the stuttering spasm.

And he stutters even when he is not speaking! The irregular breathing and the spasm of the muscles of the stutterer go on when he is reading silently or even when he is just thinking.

He stutters when he writes! It may show in little hitches or tremors in the pen strokes which bear a close resemblance to "stalling" of the tongue in speech. Although the writer may know exactly what he wants to set down, he may be unable for several seconds at a time to continue with his writing. The letters may be quite illegible and their order reversed.

Tests given in Dr. Travis' laboratory showed that stutterers differ in certain interesting ways from normal speakers, and these differences gave a clue to the origin of their difficulty.

When a right-handed normal speaker is asked to close his two hands simultaneously, he may try to do so but the movement will start in his right hand just a little sooner than in his left. When the right-handed stutterer tries the same thing, it is his left hand that usually gets off to the better start!

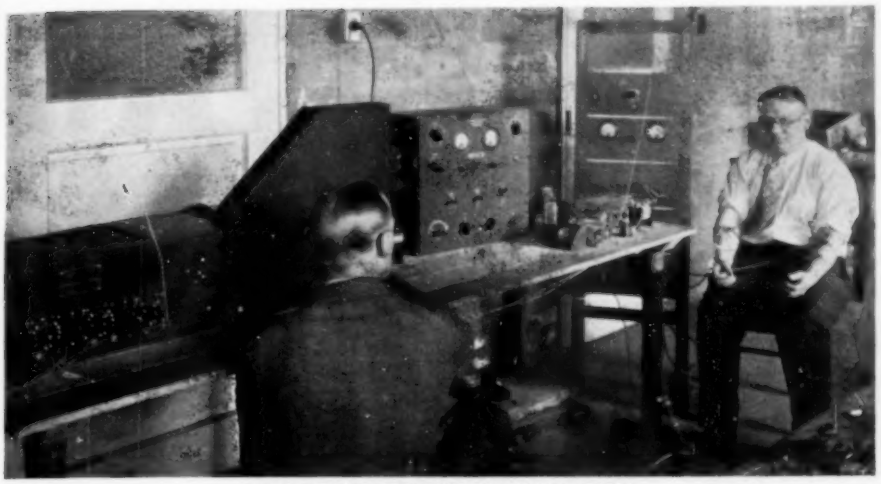
Skilled with Unpracticed Hand

Another test is to trace the simple outlines of a five-pointed star while looking at the star in a mirror. The star itself is hidden from the subject and the mirror reflection of the star and his hand is the only guide to his movements. The right-handed normal speaker, in the great majority of cases will do much better with his right hand than with his left at this task of reversing ordinary movements. Yet most right-handed stutterers are more skillful with the unpracticed left hand! A large group of 394 stutterers of all ages gave this seemingly contradictory result.

Then Dr. Travis raised the question, are these right-handed stutterers "right-eyed"? Perhaps it has never occurred to you that you use one eye any more than another. But just try sighting a gun at a target. Or looking through a telescope. Or squinting up

AIDS THE AFFLICTED

Dr. Edward Lee Travis, who advanced the new theory about the cause of stuttering and has evolved a cure.



THE STUTTERER'S PHYSIOLOGY

A motion picture camera being used in the laboratory of the Iowa Speech Clinic to record action currents from the two forearms when both hands are closed at the same time. In right-handed normal speakers, these currents usually appear first in the right forearm. In left-handed normal speakers and in stutterers, they appear first in the left forearm.

one eye to look at a painting. You will probably find that you naturally choose a certain one of your eyes. If you are right-handed, the chances are about seven to three that your favored eye will be the right eye.

Right-handed stutterers, however, are the exceptions to this rule. They naturally tend to a much greater degree to use the left eye.

Stutterers, then, although they may have developed skill in the use of the right hand so that they are considered right-handed evidently have a strong tendency toward the use of the left hand and the left eye.

Could this be the answer to the problem?

Physiologists have known for some time that the movements of the right hand, the right foot, the right eye, all the right parts of the body are controlled by the left half of the brain. The left side is controlled by the right hemisphere of the brain.

Two Heads Undesirable

Speech is a very intricate process, involving not only the muscles of tongue, lips, and jaw, but the breathing muscles of the chest and abdomen. All this apparatus must work in perfect harmony —as the engineer would put it, it must synchronize. It won't do at all for the chest muscles to be inhaling while the abdominal muscles are trying to expel the air. When this happens, stuttering results.

For this reason, Dr. Travis has decided, two heads are not better than one. One-half of the brain must be in complete control! If the other half attempts to go "red" and try out a separate government independent of its mate, the result is chaos.

It seems evident from tests of stutterers that this is the cause of the stuttering spasm throughout the whole body. Perhaps the victim was born with a natural dominance of the right hemisphere of the brain. But early in his life, parents, teachers and associates trained him early and late to use his right hand. It was "Take the rattle in your right hand, Baby," and "Try lacing your shoe with your right hand, Junior, you can do it better," and later "No, you must hold your pencil in your right hand," and "Edward, don't be so awkward, use your right hand for your knife!" It seems that only in baseball is the southpaw appreciated.

Through this constant training of the right hand, he becomes deft with it. But all the time he is training that naturally weaker left side of his brain until one side is equal or nearly equal in power to the other side. Then the stuttering begins, usually before the child is eight years old.

This difference in power between the two halves of the brain, Dr. Travis calls the "margin of dominance." This, he says, "ranges in different individuals from zero amount to a very large and safe amount. If the margin is small, stimuli of slight emotional value and conditions which bring about small amounts of physical and mental fatigue will produce stuttering. If there is equal dominance, we have the stutterer who stutters under all conditions of speech. If the margin is large, we have the normal speaker under practically all physical and mental conditions."

Of course, the left-handed child trained to be right-handed is not the only one whose margin of dominance is small. At birth, no one has it. Although many have already in them an innate tendency toward right-handedness or left-handedness, not everyone does.

Some children may delay showing any preference for one hand or the other until almost school age. A few never develop any dominance. Others may have their natural dominance interfered with by injuries to the brain by accident or illness.

Dr. Travis was not discouraged when he came to the conclusion that stuttering was an evidence of a functional disorder of the brain. Far from it! He went right ahead and developed a method for forcing the brain to work properly.

The process is not nearly so difficult as the invention of it was. It consists mainly of exercise to develop that side of the brain which should be dominant. If the tests show that the stutterer should be left-handed, his left hand goes into training; if right-handed, his right hand receives the training.

Piano-Playing Banned

Piano-playing and typewriting are banned. So also are all other activities in which both hands are used. A direct relationship has been found between the amount of daily practice on the piano and the severity of stuttering.

On the other hand, all games which will develop strength and skill in the desired hand are recommended. Tennis, horseshoes, ball pitching, punching a striking bag—even the jackstones of early days—have their part in curing the speech defect when they are practiced with the desired hand.

Writing, of course, must be done with the desired hand. But so also must cutting the meat at dinner, combing the hair, and lacing the shoes.

The important thing in curing the stutterer is somehow to make the dominant side of the brain control the speech mechanism. This may seem like an impossibility. You cannot say, "Now I will use the right side of my brain," and go ahead and do it. It is much more difficult than learning to wiggle your ears.

But the psychologist has achieved just this by training the desired hand and by the use of another ingenious device. He has the person write and speak at the same time. Writing (*Turn to page* 168)

METEOROLOGY

Spring May Be Cold Despite Little Snowfall in Canada

WHEN the snow blanket is thin in southern Canada at the end of March it is no proof April will bring sunshine and showers to northern United States. This, in effect, is the conclusion reached by R. H. Weightman, of the U. S. Weather Bureau in Washington, D. C., who investigated the popular idea that heavy winter snowfalls in Dominion territories mean chilly springs for states along the border.

Although Mr. Weightman found that during the thirteen-year period from 1916 to 1928, warm Aprils were preceded by snowfalls below normal in a number of cases, he does not believe any consistent relationship is indicated.

For the North Atlantic States the March Canadian snowfall was heaviest during the recorded period in the winter of 1923. But that year the April temperature in these states was only a negligible amount below normal. Other years, such as 1917 and 1926, had less snow in March but much lower temperatures in April. Likewise, in 1920, the April temperature was below normal while the snowfall was also under the standard mark.

Records were studied by Mr. Weightman for states from the Great Lakes area along the Canadian border to the Rocky Mountains, but results did not support the popular conception. Cold Aprils were experienced in this territory in 1917 and 1918; snowfalls, however, in most of southern Canada had not been as heavy as usual.

Science News Letter, March 12, 1932

ZOOLOGY

Smithsonian Institution Gets Siamese "Dinosaur"

A LIZARD that looks like a dinosaur, and whose eggs are considered gifts fit for a king, is among the weird "Lost World" creatures recently received from the jungles of Siam by the Smithsonian Institution. They were sent by Dr. Hugh M. Smith, former chief of the U. S. Bureau of Fisheries, now fishery expert for the Kingdom of Siam.

The big lizard, called "hia" in Siamese, is not really a relative of the dinosaurs, but it looks astonishingly like one. It has a little head at the end of a long neck, and a long, thick tail. It is not at all shy, and occasionally appears even in the outskirts of Bangkok, the national capital. It is reported to be very destructive to poultry.

The collection sent by Dr. Smith includes also a number of interesting snakes. One, known as "ngu kon kob" or "tail biting snake," is believed by the Siamese to bite with its mouth in the light of the moon and with its tail when the moon is dark. These mythical tail-bites are reputed to be absolutely deadly. Another snake is the "ngu seng atit," or "sun-ray snake," so called because of its gem-like, glittering scales. Still another snake is almost pure white, with a few black markings—possibly an albino form of a common species. Then there is the rat snake, which climbs bamboos to catch birds, the peacock snake, brightly marked and with a flame-red tail, and the fish-snake, which can be caught by baiting a hook with a whole small fish.

Science News Letter, March 12, 1932

ARCHAEOLOGY

People of Nineveh Wore False Teeth Around Necks

THERE was a curious fashion in ancient Nineveh of wearing artificial teeth around one's neck, British archaeologists have discovered. In proof that early inhabitants of the Assyrian city did go about thus adorned, archaeologists have a quantity of the beads cunningly shaped to look like human molars.

The beads were unearthed in the ruins of Nineveh and are thought to be the stock of some bead factory which flourished in the city about 2900 B.C.

A report to the British journal *Antiquity* says that it is difficult to account for use of the beads. Dr. R. Campbell Thompson of the British Museum, director of the expedition which has been excavating at Nineveh, suggests that the artificial teeth were used in magic. Many different peoples of the world have believed that magic can be worked against a person if the sorcerer has some of his teeth or his hair or even his name.

Another suggestion is that the artificial teeth were worn as protection against toothache.

So far as archaeologists know, the people of Mesopotamia never took to wearing real human teeth, as some races have. So, the artificial teeth from Nineveh cannot be explained as something "just as good" manufactured to eke out the supply of real human teeth in a shortage.

Science News Letter, March 12, 1932

IN SCIEN

PSYCHOLOGY-PHYSICS

Medium Illumination Best For Observing Fine Detail

INCREASE in the brightness of light will make objects stand out from one another with greater clearness up to a certain optimum brightness, but beyond that point increase in illumination merely makes them blur and run together again.

The reason for this variation in the acuity of vision with change in illumination was explained by Dr. W. W. Wilcox of the University of Kansas.

When two narrow bars are seen against a faintly lighted background they appear much larger than their actual size would indicate and physically must be separated by a relatively large distance in order not to appear as one object. Increasing the light intensity has the effect of decreasing the apparent width of each bar and thus making the interspace more easily observable. The apparent shift of the edges of the bars accounts for the change of acuity with variations in light intensity. Dr. Wilcox found a similar relation between the shift of contours of the test object for lighted bars on a dark ground.

His experiments do not confirm the theory previously held by some psychologists that change in light intensity calls into use a different number of elements in the retina of the eye.

Science News Letter, March 12, 1932

ZOOLOGY

South African Mule Mother of Two Colts

FOR a second time a female mule in South Africa has borne a colt, an event so rare in the annals of science that many persons still hold it to be an impossibility, it is reported in *Nature*.

The mule is the property of W. J. Kilian, of Weenen, Natal. She is just a common, ordinary mule; but both the colts which she has borne and nursed were sired by stallions and are practically indistinguishable from horses.

Science News Letter, March 12, 1932

ENCE FIELDS

FORESTRY

Poisoning Cheapest Way To Kill Undesirable Trees

UNDESIRABLE trees, that must be gotten out of the way in a forest to give more desirable species a chance to grow properly, can be weeded out more advantageously by poisoning than by cutting or girdling. So say A. L. MacKinney of the U. S. Forest Service and Prof. C. F. Korstian of Duke University, in the *Journal of Forestry*.

The methods most widely practised at present are cutting and girdling; but of recent years the elimination of undesirable trees with poison has been used to some extent, especially in Australia. In order to get a comparison under American conditions, Mr. MacKinney and Prof. Korstian divided into three sections a piece of developing pineland which was due for a thinning out of unwanted young hardwood trees, and used the three methods side by side, keeping a strict account of all costs.

The poison consisted of a mixture of white arsenic and lye, and was applied to the young trees in a "frill" made by chopping downward into the bark, in a kind of partial girdling. One workman wielded the ax and a second followed with the poison pot.

It was found, after a suitable interval, that the poison method had resulted in the highest percentage of outright deaths among the "weed" trees, as well as in the greatest discouragement to the growth of new sprouts among those that did survive. It was also found that if the commercial grade of white arsenic is used, the poison treatment is more economical than either cutting or girdling, both in money cost and in time.

Science News Letter, March 12, 1932

PSYCHOLOGY

Aura Seen by Spiritist Really Optical Illusion

WHEN a spiritist believes he sees a grayish aura around the white flesh of a human body, he really is deceived by an optical illusion, Prof. D. F. Fraser-Harris, physiologist and author, said in an address before the British Psychological Society, reported in a current issue of *Nature*.

To see the aura, you are directed to hold the outstretched fingers of your two hands touching one another at the level of the eyes about a foot or so in front of a black background. You stare at the finger tips for about fifteen seconds, and then draw them slowly apart.

Where your finger tips met, you will then see black spaces which do not show up, however, because of the dark background. Between these are areas filled with the "grayish mists."

The cause of the illusion is what is known to psychologists as a negative after-image. If you stare fixedly at a bright red object for a few seconds and then look at some neutral background, you are likely to see a patch of color, the approximate size and shape of the red object. If your after-image is positive, the color of this "shadow" will be red. A negative after-image in this case would be green.

Staring at the white finger-tips may cause a person to see a black patch when the fingers are withdrawn, and the grayish or whitish mists are similarly caused by staring at the black background, Prof. Fraser-Harris indicated.

Science News Letter, March 12, 1932

CERAMICS

Metal Strips Waterproof Brick Walls Permanently

BRICK WALLS of the modern home are not waterproof even though chemically treated, but may be made permanently so through the use of metal strips, it appears from a report to the American Ceramic Society. This radical method of brick construction was presented in a paper prepared by L. H. Minton, of New York City.

Under the new method, it was stated, a V-shaped groove three-eighths of an inch deep is moulded along the center line of the two faces of each brick which are to be mortared as well as in the corresponding position at the ends. Into this groove goes an L-shaped metal strip, of a non-corrosive alloy. The hook of the L fits into the end groove on the brick.

As the bricks are laid, the grooves of successive layers meet so that the metal strips, which overlap from one brick to another, form a continuous mesh to reinforce the wall and keep out the moisture, Mr. Minton said. It was also stated that use of the metal strips made the task of aligning the bricks much easier besides giving greater heat insulation.

Science News Letter, March 12, 1932

BACTERIOLOGY

More Invisible Bacteria Than Visible Ones in Milk

THE FILTERABLE forms of germs, which are so small that they cannot ordinarily be seen even with the most powerful microscopes, far outnumber their larger, microscopically visible relatives in such substances as milk and milk products, soil, hay infusions and decomposing manure, experiments by Prof. J. M. Sherman and C. E. Safford of Cornell University show.

The ordinary forms of germs may be found by the million or even billion in one gram, which is roughly one-thirtieth of an ounce, in certain types of decomposing and fermenting materials. But the Cornell investigators found not millions but trillions of the minute organisms to the gram in some samples of milk, they reported to *Science*.

The new method combines a series of dilutions of the material to be examined with a longer period for growth in broth at a temperature of about 86 degrees Fahrenheit.

Contamination of milk and water with germs is ordinarily determined by a method of counting the number of microscopically visible germs of bacteria present in a given sample. But such examinations take no account of the invisible organisms which may be present. This class of invisible, filter-passing organisms is becoming increasingly important, especially since it has been found that some ordinarily visible germs may have an invisible stage. So the method developed by Prof. Sherman and Mr. Safford may be of considerable practical signficance.

Science News Letter, March 12, 1932

PSYCHOLOGY

Overprotected Child Excels in English Class

THE child who gets too much mothering, or who, as the psychiatrists say, is maternally overprotected, may be the "shark" of the English class, Dr. David M. Levy, of the Institute for Child Guidance, New York City, has found.

Dr. Levy reported his observations on the relation of maternal overprotection to school grades and intelligence tests to the American Orthopsychiatric Association. The overprotected child shows excellence in English, he said, does well in arithmetic and takes a special interest in reading.

Science News Letter, March 12, 1932

CHEMISTRY

The Newer Metals of Group IV

"A Classic of Science"

A Century of Chemical Progress Is in the Contrast of Hafnium's Prediction With the Others' Chance Discovery

Zirconium

KLEINE MINERALOGISCHE BEYTRAEGE (*Minor Mineralogical Contributions*); *vom Hrn. Prof. Klaproth. In Crell's Chemische Annalen für die Freunde der Naturlehre, Arzney-gelahrtheit, Haushaltungskunst und Manufacturen: I. Band,* 1789.

THE analysis of zircon has given me almost as much trouble as that of corundum; on the other hand I have been rewarded by repeatedly finding an elemental earth which seems new to me. The complete account of my experiments on this mineral will appear in the next number of the present volume of *Schriften der Berlin. Naturf Freunden.* In the meantime I have determined the constituents of this kind of gem, in percentages:

Silica 31½; nickeliferous iron oxide ½; unknown earth, which seems new to me, 68. The contituents of corundum, after separation of the fine grains of magnetic iron interspersed with it, are ⅔ alumina and ⅓ an earth likewise strange to me, which, so long as it was not removed from its natural intimate combination with the alumina, would dissolve, although with difficulty; after accomplishing the separation from alumina, however, it proved entirely insoluble, in acids and in alkaline salts. The new earth from zircon on the contrary is insoluble in alkalies but easily soluble in acids.

My researches on the constitution of other precious stones are not yet complete enough for announcement. I am sorry that my results do not agree with the determinations of Mr. *Bergmann* and other analysts.

Titanium Found in Menakanite

BEOBACHTUNGEN UND VERSUCHE UBER DEN MENAKANITE, einen in Cornwall gefundenen magnetischen Sand; vom Hrn. William Gregor. (*Observations and experiments in a magnetic sand found in Cornwall; by Mr. William McGregor*). *In Crell's Chemische Annalen . . . I. Band,* 1791.

This sand is found in great abundance in a valley in the parish of Menakan in the county of Cornwall. Through this valley flows a brook whose source is in the valleys of Gonhilly. The sand is black, and has externally a resemblance to gunpowder. Its grains are of various sizes and have no definite shape. It is mixed with another dirty-white sand, whose grains are much finer. The specific gravity of the black sand, separated from the other by a sieve, was to that of distilled water, by the method of Mr. de Lugart,=4.427 : 1. It is easily reduced to a fine powder, and is magnetic. . . .

[A long account follows of the experiments made upon this mineral. These lead McGregor to the following conclusion.]

I send in this letter scattered facts rather than a completed research. And I do not offer you my theory for the purpose of securing priority of publication; I leave such clever work to sharper philosophers than I.—My friend, Mr John Hawkins, has seen this sand, and has confessed to me that he has never seen a mineral like it. Such an expression from a man so outstanding in mineralogy, combined with the unusual properties of the sand, have led me to think that it contains a new metallic substance. In order to distinguish it from others I have ventured to give it a name suggested by the place where it is found (that is in the parish Menackan), and on that account the metal could also be called Menakanite. The researches of other chemists, may perhaps, by explaining its strange properties, rob it of its novelty. Other matters have hindered me from carrying out further the research from which I have already won this much, onto the sure ground of experience. But the scattered facts which I have laid before you here may help to save much trouble for others who take up the examination of this strange substance.

MARTIN HEINRICH KLAPROTH
(1743-1817)

a German apothecary who advanced the methods for chemical analysis of minerals. In addition to his discovery of zirconium as told here, he isolated the metal from "menakanite" and renamed it titanium. Uranium and cerium are also his finds.

Thorium

UNTERSUCHUNG EINES NEUEN MINERALS und einer darin enthaltenen zuvor unbekannten Erde. (*Examination of a new mineral and a hitherto unknown earth contained in it*); *von J. J. Berzelius. In Annalen der Physik und Chemie, Jahrgang* 1829, *Siebentes Stück.*

The mineral, the examination of which I am reporting here, occurs on Löv-ön, an island lying in the sea near Brevig in Norway, in syenite. It was itself discovered by Rev. Esmark, a son of the famous professor of mineralogy in the University of Christiana, Jens Esmark, who recently sent me a sample of this mineral for analysis, because, on account of its great specific gravity, he suspected tantalum in it. . . .

This mineral contains a hitherto unknown metallic body, which from its properties belongs to those which comprise the so-called true earths; its oxide

is an earth, which is most like the earth of zircon, and which, strangely enough, possesses most of the properties and earmarks which I found for thorium earth in my former description of it. This circumstance at first made me think that thorium earth might possibly not be merely basic yttrium phosphate, as my later researches seem to prove, but a mixture of this and thorium earth. By this I was moved in the beginning of this analysis to let the new earth have the name Thorium earth, and since by a repeated analysis of the remainder of the mineral in which I thought I had found the former thorium earth,[1] I could not discover the slightest trace of the new, so I have, and with so much greater right, thought I might retain for the latter the same name, since the former description for the most part fits the new earth, and the name Thorium earth is once more introduced to science. This offers at the same time an opportunity for naming the new mineral; I name it *Thorite*.

Hafnium

ON THE MISSING ELEMENT OF ATOMIC NUMBER 72. *Letter from Universitets Institut for teoretisk Fysik. Copenhagen, January* 2, *by D. Coster and G. Hevesy. In Nature, London, January* 20, 1923.

Since Moseley's discovery of the fundamental laws of the X-ray emission, it has become quite clear that the most simple and conclusive characteristic of a chemical element is given by its X-ray spectrum. In addition, Moseley's laws allow us to calculate very accurately the wave-lengths of the X-ray spectral lines for any element in the periodic table, if those of the elements in its neighborhood are known. Taking into account that the presence of a very small proportion of a definite element in any chemical substance suffices to give a good X-ray spectrum of this element, it is quite evident that for the eventual discovery of any unknown element X-ray spectroscopy, especially as it has been developed by Siegbahn, represents the most effective method.

In the *Comptes rendus* of the Paris Academy of Sciences for May 22, 1922, Dauvillier announced the detection by means of X-ray spectroscopy of the element 72 in a mixture of rare-earth metals. This element was identified by Urbain with a rare-earth element, which he called celtium, the presence of which he had previously suspected in the same sample. For different reasons, however, we think that Dauvillier's and Urbain's conclusions are not justified. It appears from Dauvillier's paper that at any rate the quantity of the element 72 in the sample, if present, must have been so small that it seems very improbable that the element 72 should be identical with the element which in former papers Urbain claims to have detected in the same sample by investigation of the optical spectrum and of the magnetic properties. The only lines which Dauvillier claims to have detected are the lines L *alpha* 1 and L *beta* 2, both of which he finds to be extremely faint (*extrêmement faible*). The wave-lengths he gives, however, for these lines are about 4 X.u (1X.u.=10^{-11} cm.) smaller than those which are obtained by a rational interpolation in the wave-lengths tables of Hjalmar and Coster, for the elements in the neighborhood of 72.

From a theoretical point of view it appears very doubtful that the element 72 should be a rare-earth. It was announced in 1895 by Julius Thomsen from Copenhagen that from general consideration of the laws of the periodic system we must expect between tantalum, which in many compounds possesses five valencies, and the trivalent rare-earths, a tetravalent element homologous to zirconium. The same view has also recently been put forward by Bury on the basis of chemical considerations, and by Bohr on the basis of his theory of atomic structure. It is one of the most striking results of the latter theory, that a rational interpretation of the appearance of the rare-earth metals in the periodic system could be given. For these elements, according to Bohr, we witness the gradual development of the group of 4-quantum electrons from a group con-

[1] It seems to me probable that the Eudialite from Greenland might contain thorium earth, particularly since the properties of zirconium at the time of Stromeyer's analysis of Eudialite were not as well known as now, consequently the new earth might possibly have been taken for zirconium earth; I found however, according to the method specified by Stromeyer, only zircon earth present.

Fifty years ago, Pasteur's contemporary

ROBERT KOCH

opened up a new chapter in the history of medicine with his discovery of the

Tubercle Bacillus

This paper will be the next

CLASSIC OF SCIENCE

ETHNOLOGY

Seminoles Not Un-Musical But Have Kept Music Secret

A LONG-STANDING mystery regarding the picturesque Seminole Indians of the Everglades has at last been fathomed.

The mystery is why the Seminoles should be so hopelessly un-musical a tribe. The solution, discovered by Miss Frances Densmore, collaborator for the Bureau of American Ethnology, is that the Seminoles are not hopelessly unmusical at all. They have merely kept their music very much to themselves, and so it remained unheard, and unheard of, among their white neighbors.

Miss Densmore, who has had long experience in studying music of Indian tribes, has found the Seminoles friendly and cooperative, despite their reputation for being most uncommunicative.

"People who have lived for years among the Seminoles have insisted that they do not sing, except 'ki-yi' when they are drunk," says Miss Densmore.

"The explanation is that they sing only at the June Corn Dance and the October Hunting Dance, and on those occasions the singing is done mostly by one man. The dancers do not sing."

Learning this important fact, Miss Densmore won an introduction to the head singers of the Big Cypress group and the Cow Creek group of Seminoles and thus found herself at the source of information on Seminole music.

Sang for Three Days

The ethnologist stated that she has just finished recording 125 songs from one of the head singers of this "unmusical" tribe. And the singer had not exhausted his supply. He sang one song after another for three days, while the ethnologist made her records. Never before has Miss Densmore found an Indian who knew so many.

Far from being monotonous "ki-yi" singing, the Seminole songs are good music, with pleasing melodies and showing wide variety, she discovered.

taining 18 electrons into a group of 32 electrons, the numbers of electrons in the groups of 5- and 6-quantum electrons remaining unchanged. Bohr was able to conclude that in the element lutecium (71) the group of 4-quantum electrons is complete, and we consequently must expect that in the neutral atom of the next element (72) the number of electrons moving in 5- and 6-quantum orbits must exceed that in the rare-earths by one. The element 72 can therefore not be a rare-earth but must be an homologue of zirconium.

In view of the great theoretical importance of the question we have tried to settle it by an experimental investigation of the X-ray spectrum of extractions of zirconium minerals. We have succeeded in detecting six lines which must be ascribed to the element 72 (in Siegbahn's notation L *alpha* 1, *alpha* 2, *beta* 1, *beta* 2, *beta* 3, *and gamma* 1. *The* complication was met that the lines L *alpha* 1 and *alpha* 2 lie almost exactly in the place corresponding in the spectrum to the zirconium K *alpha* 1, and *alpha* 2, lines in the second order. Difficulties which might arise from this fact may easily be avoided by keeping the tension on the tube between the critical tension of the zirconium K-lines (18,000 volts) and that of the L-lines of the missing element (10,000 volts). Besides, the relative intensity of the K *alpha* lines is so different from that of the two L *alpha* lines that any ambiguity is already thereby excluded. Not only the L *alpha* lines but also the lines L *beta* 1, *beta* 2, and *beta* 3 were, as regards their mutual distance and their relative intensity, in exact agreement with the expectation. The values which we obtained for the wave-lengths of the six mentioned lines all agree within one X.u. with those found by interpolation. Between our values for the lines L *alpha* 1 and L *beta* 2, and those published by Dauvillier, however, there exists the discrepancy referred to of about 4 X.u. (in general for other elements which have been measured by Dauvillier and by Coster the discrepancy is never more than 2 X.u.). Exposures under different conditions as well as a thorough discussion of the plates showed that the new lines found during our investigation cannot be ascribed to the first or higher order spectrum of any other known element. Our provisional results are, L *alpha* 1 = 1565.5; *alpha* 2 = 1576; *beta* 1 = 1371.4; *beta* 2 = 1323.7; *beta* 3 = 1350.2; *gamma* 1 = 1177 X.u. More accurate and complete data as well as photographs of the spectrum will soon be published.

In a Norwegian zirconium mineral the new lines were so intense that we estimate the quantity of the element 72 present in it to be at least equal to one per cent. Besides we investigated with low tension on the tube a sample of "pure zirconium oxide." Also with this specimen the L *alpha* lines were found, but very faint. It seems to be very probable that ordinary zirconium contains at least from 0.01 to 0.1 per cent. of the new element. Especially the latter circumstance proves that the element 72 is chemically homologous to zirconium. Experiments are in progress to isolate the new element and to determine its chemical properties.

For the new element we propose the name Hafnium (Hafniae = Copenhagen).

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MEDICINE

Skin Color Makes Negroes Get Rickets More Easily

DISEASES which Negroes may safely be said to have oftener or less often than whites solely because of the racial factor are only those diseases which depend on differences in the skin, Dr. Harry Bakwin of New York University and Bellevue Hospital Medical College has found as a result of studies of the differences between white and Negro infants in health and disease.

For example, rickets-preventing ultraviolet light does not penetrate the Negro skin as readily as the white skin, which explains why rickets and tetany occur more often in Negro than in white children in temperate regions, Dr. Bakwin explains in a report to *Human Biology*.

"A second difference in the Negro skin is its reaction to external heat," Dr. Bakwin pointed out. "When the external temperature is high, body temperature regulation is better in the Negro than the white individual. This explains, in part at least, their greater ability to withstand high external temperatures, e. g. in stoke rooms, and the lower incidence among them of heat-stroke.

Some investigators have found a relation between heat and the incidence of summer diarrhea. If this is true, the Negro's more effective mechanism for withstanding heat may account for the fact that in certain communities the Negro infant death rate from diarrheal diseases is no higher than the white, even though the Negro lives under poorer hygienic conditions, which would tend to increase the death rate from this disease.

Another property of the skin, which is probably racial, may account for the comparative immunity of the Negro to various skin infections, such as erysipelas and boils, Dr. Bakwin concluded.

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ZOOLOGY

Yellowstone Elk Have Steam-Heated Dormitory

A SMALL BAND of Yellowstone Park elk, through luck or animal instinct, has found for itself a steam-heated dormitory in the midst of the park's winter-bound interior.

Park Ranger Curtis K. Skinner, while on patrol one winter day, observed the elk in Midway Geyser Basin, just above the great Excelsior crater. Examination of the spot showed a small plot of level sandy ground which is kept constantly dry and warm throughout the long snowy winter months by steam channels which lie close beneath the surface and which give off their vapor through surrounding vents and pools. Mr. Curtis inserted a small thermometer beneath the surface of the sand and found the temperature to be just about 70 degrees Fahrenheit, the standard room temperature. Experimenting still further, he found by personal experience that one could rest quite comfortably on the ground.

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Continued from page 163

with the left hand is controlled by the right side of the brain. Speech going on at the same time would naturally come under the same control.

The person begins by copying words and speaking them at the same time. The writing movement is always started before the word is pronounced. Then the words may be spoken more rapidly and only the initial letter written. Finally ordinary conversation is conducted in this manner.

The stutterer finds it much easier to speak when he combines his speech with writing in this manner. Gradually his speech improves until only certain sounds give difficulty. Then he need only write the first letters of those words which cause the trouble.

If you stutter, you will be glad to know that Dr. Travis does not recommend phonetic drills. Forcing a stuttering child to recite frequently in class is condemned as downright harmful.

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FORESTRY

Winter Rains to Aid Rangers In Fighting Fires This Summer

Ten-Pound Radios, Which Can Be Carried on Back, Also Expected to Facilitate Protection of National Forests

THE FOREST FIRE season, which begins in the East during the latter part of this month, is expected to be much less disastrous than that of memorable 1931, Roy Headley, of the U. S. Forest Service in Washington, D. C., revealed to Science Service. Despite the alarm occasioned by the burning in the Florida Everglades, there are no fires of any consequence in national forests now, he said.

Rain and snow have fallen heavily throughout the West this winter, breaking the ten-year precipitation record for southern California. As a result ground water is being replenished in national forest states and the opening of the western fire season will probably be delayed until the middle of June. Last spring, the excessive drought and the high, parching winds made conditions in the Northwest acute by April. The cycle of declining precipitation, which has extended over the last dozen years in the West, is believed to be at an end, and normal weather is hoped for, Mr. Headley stated.

New equipment, Mr. Headley also said, is to be tried out in the national forests this summer. Fire fighters will go into the field for the first time with radio sets they can carry on their backs. Each set, consisting of both transmitting and receiving units, weighs but ten pounds and will enable the forest personnel to keep in touch by signal code.

The approaching fire season will also see the introduction of the improved radio outfit which permits transmission not only of code but of voice as well. These sets, greatly simplified and extremely reliable, weigh but 25 pounds and can be transported on horse back. If funds are available several hundred of them will be purchased.

The 25-pound set is a refinement of the 78-pound outfit experimented with in Columbia National Forest during the summer of 1930. Strenuous tests, it was said, have shown the lighter set to be "almost too good to be true." It permits the broadcast of the voice up to a distance of 100 miles.

The new radio sets will find wide usage in fire fighting activity, it was stated. Whenever a member of the forest personnel is away from a telephone he can make his report and receive orders by radio. This is frequently the case in many areas during acute periods of fire fighting. Both the ten- and 25-pound sets will be used under these conditions, while heavier sets are also slated for use on forest service boats in Alaska to make possible communication with points on shore.

Widespread use of the radio sets, Mr. Headley stated, is necessarily dependent upon financial considerations. He also cautioned that the new instruments cannot be counted on, as some persons would expect, to put an end to forest fires. Fire control, however, will undoubtedly be greatly facilitated by them.

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PHYSIOLOGY

Extract of Blood-Forming Hormone Checks Anemia

A POTENT extract of normal human stomach juice which will check pernicious anemia when injected into the muscles has just been prepared by Drs. Roger S. Morris and Leon Schiff of Cincinnati, Ohio, in collaboration with Drs. George Burger and James Sherman of the department of internal medicine, University of Cincinnati.

The extract, science's latest weapon with which to fight this once fatal disease, is thought to contain a blood-forming hormone which the Cincinnati investigators have named "addisin" in honor of Thomas Addison, who first described the disease.

That the normal human stomach secretes a substance which prevents the development of pernicious anemia was discovered by Dr. William B. Castle and his associates at the Boston City Hospital, who also found that feeding pernicious anemia patients beef muscle which had been digested by normal human stomach juice checked the malady. Feeding stomach juice itself was not successful, but the Cincinnati investigators have reported to the *Journal of Medicine* that their concentrated stomach juice when injected into the muscles produces an effect similar to that of liver extract.

Science News Letter, March 12, 1932

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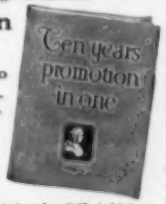

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METEOROLOGY

Great Flood Weakened China; May Have Precipitated War

Rainfall Figures of 1931 Inundation Explain Why Reserve Supplies Were Lost, Leaving Nation Vulnerable

FROM the interior of war-torn China have come the first official reports of the drenching rains of last summer which sent the Yangtse river into roaring flood and by laying waste to lives and property impaired the resistance which can now be offered invading Japanese armies.

Waited for Chance

The financial straits China now experiences are largely due, the legation of this oriental nation at Washington stated, to losses from the flood. It was also stated that Japan waited until the raging waters left their cruel mark and then took advantage of the opportunity to attack a weakened country. At the time of the disaster the U. S. Department of Commerce reported that the majority of China's reserve clothing, foodstuffs, and machinery had been destroyed by the flood.

Although gathering rainfall records in America is an easy and rapidly accomplished task, in China there is a lack of meteorological organization, and it is months after such a calamity as the recent flood before the telltale figures can reach the outside. At many of the weather stations, the Department of Commerce reveals, information must be carried either by airplane or along the treacherous Yangtse in a frail boat, as there are no roads in that wild section of the interior.

Stations in the Yangtse drainage area have yielded precipitation figures which explain why the 1931 inundation was the worst since 1850. At the city of Hankow, where the flood waters surged most disastrously, the rainfall increased steadily from 1.6 inches for 11 days of rain in January of last year, to 21.5 inches for 22 rainy days in July, 1931, when the flood was at its peak.

This 21.5 inches represents approximately half the total average annual rainfall for that city during the last decade, and almost equals the amount of rain the western part of the American grain belt receives in an entire year. Hankow is situated directly on the Yangtse some few hundred miles west of Shanghai, near where the now peaceful river empties into the ocean as Japanese warships and bombing planes continue the destruction initiated by the flood. Figures from other Chinese cities also show how the rainfall began increasing from January and February until the summer months when the rains poured in destructive torrents.

The flood rains were greater than in former years. Changsha, south of Hankow in the province of Hunan, had 33.7 inches of rainfall during May, June, and July last year, while the average precipitation for these months over the past 14 years is only 20.94 inches. At Ichang, where the Yangtse roars out of its high rock walls, the early summer average for the last 11 years is 18 inches of rainfall, but in 1931 32.5 inches fell from May through July, and during July it rained fourteen days at an average of an inch per day. Rainfall figures for these months were also in excess of previous years at the Chengtu weather station in the Szechwan uplands.

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NATURE STUDY

Nature Calendar Shows Outdoor Life for Month

THE Nature Calendar as a museum exhibit is a feature of the Buffalo Museum of Science. Month by month throughout the year the exhibits in the two cases devoted to the Nature Calendar are changed so that natural objects to be found out of doors during the month are shown in season.

In the top of each case is a large headline label bearing the title of the case—Out-of-Doors This Month. Beneath this is a dial on which are indicated the months and seasons, with a hand pointing to the current month.

The March exhibit features one of the earliest spring flowers in Western New York, the pussy willow. The mourning-cloak and tortoise-shell butterflies which have been in hibernation during the winter and so appear early are given a place with the first spring arrivals among the birds. A promethea moth cocoon also figures in the exhibit. Of the birds are shown robin, song-sparrow, meadow lark, and bluebird. A bluebird house of simple design suggests that the house should be ready for occupancy in time if one wishes to have these birds nest near by. This bird house is made to simulate a section of tree trunk and may be constructed of packing-box material.

Among the small mammals which may be looked for in the woods are the squirrels which are in evidence the year around. Black, red, and flying squirrels are shown this month in the Nature Calendar.

Each object is labeled and a few lines of poetry conveying a thought for the month form the subject of a card displayed on the back wall of the case.

Exhibits must be of such nature as will permit their being kept in a closed case for a month. This precludes wild flowers generally unless modeled in wax. The willow catkins used this month have been forced into bloom in the house. They will remain on the dry stems for several weeks.

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A transparent adhesive tape that requires no moistening has been produced from cellophane.

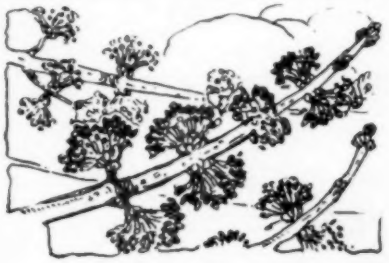
MARCH HARE AND OTHERS

The new Nature Calendar of the Buffalo Museum of Science.

BOTANY

Nature Ramblings

By FRANK THONE



The Bees' First Feast

THE SOFT MAPLE trees are in a dusky smoldering flame of flower, through which delirious bees dance like dervishes. The bees have had a long period of enforced idleness, and it is downright providential for them that on their first days of free flight they can find such a lavish provider of nectar and pollen and oozing sweetish sap.

The soft maple does not wait for its flowering until the ground thaws out. It does not need ground-water, apparently. There seems to be enough sap stored in trunk and branches to supply the buds when the impulse to break forth is imparted to them by the first promises of springtime warmth. This independence of water supplies from the ground is evidenced by the behavior of pruned branches or felled trees, which may have been lying on the ground all winter. They will blossom at the same time as the standing trees, and almost as freely.

Blossom time is the one brief time in the whole year that the soft maple tree is worth its keep. The rest of the time it is a good deal of a shiftless nuisance. Its leaves seem to have an especial attraction, in summer, for the poison-bristled tussock moth caterpillar. Like many other citizens of dubious value, it is exceedingly prolific of offspring, littering the lawns with billions of seeds. It has a bad habit of going rotten inside at a comparatively early age, and letting big limbs snap off when high winds blow. And yet, when its flowers bring all the bees flying on early warm days, we are likely to forgive it all these sins and others besides, as we are likely to be indulgent toward the town ne'er-do-well because he can whistle like a brown thrasher or carve pretty trinkets of white wood for the children.

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ARCHITECTURE

New Colors in Stone Sought As Relief From Machine Age

MAKING STONE take on the delicate colors of the beautiful luna moth is one evidence of the efforts being expended to gain relief in architecture from the monotony of a machine age. That is what Fred R. Lear, professor of architectural design at Syracuse University, told the American Concrete Institute.

Prof. Lear explained how he reproduced the varied shadings of the insect with a mixture of cement, crushed stone, and color pigments. It is through this medium of synthetic stone, he stated, that the demand for appropriate color in home, school, and skyscraper is being satisfied.

Artificial stone, he said, has been known for some time, but only recently have colors in stone been appreciated for their intrinsic value, and never before has mass production of color in building enterprise been so keenly taken into account.

Metallic oxides are largely used to achieve the desired intensity and shading of the color in the laboratory material. Unlike natural stone, all the hues of the rainbow can be duplicated.

The stone is molded into any necessary shape without the loss from chipping which is characteristic of ordinary stone work. The cast stone can be used alone or in combination with other building materials such as brick.

Cast stone is made with material like crushed marble or granite as a base, according to the quality desired in the resulting product. It is as durable as any natural stone of its price level and retains its color much longer, Prof. Lear stated. In the early days of cast stone, he explained, imitation of natural products was the chief aim. While it is still possible to duplicate these stones, the molded material is now a distinct, individual creation.

Science News Letter, March 12, 1932

Brooklyn Botanic Garden Publications

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General Science

• Booklists of the A. A. A. S.

The American Association for the Advancement of Science has recently published a series of leaflet booklists on twenty-seven different scientific subjects. The selection of the books was on the basis of evaluation by a considerable number of scientists all over the country. The following is a list of the titles in the General Science, History, Biography and Method lists, without the descriptive notes which appear in the leaflets. The following lists also include some changes in titles that have been made on account of the appearance of important new books during the last few months. The titles of the books in the remainder of the twenty-seven lists will appear in subsequent issues of the SCIENCE NEWS LETTER. These lists have been compiled by Joseph L. Wheeler, Chairman, Booklist Committee, of the American Association for the Advancement of Science.

Science in Today's World

General Introductions

Ward, C. H. Exploring the universe; the incredible discoveries of recent science 353p. 1927 Bobbs-Merrill $3.50.

Caldwell, O. W. and Slosson, E. E., eds. Science remaking the world 292p. 1923 Star ed. Garden City $1.00.

Thomson, Sir J. A., ed. The outline of science 1220p. 4v. 1922 Putnam $4.50 ea.

Newman, H. H., ed. The nature of the world and of man 556p. 2d ed., rev. 1927 Univ. of Chicago Press $5.00, (also Educ. ed. $4.00.)

Huxley, T. H. Essays 330p. 1929 Modern readers' ser. Macmillan $.80.

Davis, Watson, ed. Science today 310p. 1931 Harcourt $2.50.

Ginzburg, Benjamin The adventure of science 487p. 1930 Simon & Schuster $5.00.

Langdon-Davies, John Man and his universe 341p. 1930 Harper $5.00.

Millikan, R. A. Science and the new civilization 194p. 1930 Scribner $2.00.

Pupin, M. I. The new reformation 273p. 1927 Scribner $2.50.

Cleveland, F. A., ed. Modern scientific knowledge 592p. 1929 Ronald Press $4.50.

Annual report of the Smithsonian Institution for the year ending June 30, 1930 650p. 1931 Washington, D. C. Superintendent of Documents $2.00.

Physical Sciences

Slosson, E. E. Creative chemistry 341p. 1930 new rev. ed. Century $3.50.

Bragg, Sir Wm. H. Concerning the nature of things 231p. 1925 Harper $3.00.

Jeans, Sir J. H. The mysterious universe 163p. 1930 Macmillan $2.25.

Eddington, Sir A. A. The nature of the physical world 561p. 1928 Macmillan $3.75.

Biological Sciences

Haldane, J. B. S. Possible worlds 305p. 1928 Harper $2.50.

Jennings, H. S. The biological basis of human nature 384p. 1930 Norton $4.00.

Wells, H. G., Huxley, J. S. and Wells, G. P. The science of life 1514p. 2v. 1930 Doubleday $10.00.

Comstock, Mrs. A. B. Handbook of nature study for teachers and parents 942p. 22d ed. 1931 Comstock Pub. Co. $4.00.

General Science Texts

Caldwell, O. W. and Curtis, G. F. D. Introduction to science 696p. 1929 Ginn $1.68.

Hunter, G. W. and Whitman, W. G. Problems in general science 688p. 1930 American Book Co. $1.72.

History of Science

ITS BIOGRAPHY and METHOD

History

Mayer, Joseph The seven seals of science 444p. 1927 Century $3.50.

Sedgwick, W. T. and Tyler, H. W. A short history of science 474p. 1927 Macmillan $3.00.

Harvey-Gibson, R. J. Two thousand years of science 508p. 2d ed. rev. and enl. 1931 Macmillan $3.50.

Dampier-Whetham, W. C. D. A history of science and its relations with philosophy and religion 514p. 2d ed. rev. 1930 Macmillan $4.00.

Drachman, J. M. Studies in the literature of natural science 487p. 1930 Macmillan $4.00.

General Biography

Jordan, D. S., ed. Leading American men of science 471p. 1910 Holt out of print. $3.00.

Makers of Physical Sciences

Gibson, C. R. Heroes of the scientific world 343p. 1926 Lippincott $3.00.

History of Science Society Sir Isaac Newton 351p. 1928 Williams & Wilkins $5.00.

Hart, I. B. Makers of science 320p. 1923 Oxford Univ. Press $2.00.

Jaffe, Bernard Crucibles; the lives and achievements of the great chemists 378p. 1930 Simon & Schuster $5.00.

Curie, Mme. M. S. Pierre Curie; tr. by Charlotte and Vernon Kellogg 242p. 1923 Macmillan $2.25.

Pupin, M. I. From immigrant to inventor 396p. 17th ed. 1923 Scribner $1.00.

Great Naturalists, Botanists, Etc.

Vallery-Radot, René The life of Pasteur 484p. 1927 Star ed. Garden City $1.00.

De Kruif, P. H. Microbe hunters 363p. 1926 Blue Ribbon Books $1.00.

Cushing, H. W. The life of Sir William Osler 1442p. 2v. 1925 Oxford Univ. Press $12.50.

Osborn, H. F. Impressions of great naturalists 294p. 2d ed. rev. 1928 Scribner $2.50.

Locy, W. A. Biology and its makers 477p. 3d ed. rev. 1915 Holt $3.00.

Singer, Charles A short history of biology 572p. 1931 Oxford Univ. Press English price 18 sh.

Ward, C. H. Charles Darwin 472p. 1927 Bobbs-Merrill out of print. $5.00.

Agassiz, G. R. ed. Letters and recollections of Alexander Agassiz 454p. 1913 Houghton out of print. $5.00.

Saidla, L. E. A. and Gibbs, W. E. eds. Science and the scientific mind 598p. 1930 McGraw-Hill $3.00.

Gregory, Sir R. A. Discovery: the spirit and service of science 347p. 1923 Macmillan $2.00.

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